San Joaquin River Dissolved Oxygen TMDL Steering Committee
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Attn: Lowell Ploss

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February 4, 2003

Mr. Thomas R. Pinkos Executive Director
California Regional Water Quality Control Board
Central Valley Region
3443 Routier Road, Suite A
Sacramento, CA 95827

Subject: Implementation Plan, Dissolved Oxygen Total Maximum Daily Load, San Joaquin River Deep Water Ship Channel

Dear Mr. Pinkos:

The Bay Protection and Toxic Cleanup Plan of 1999 allowed for the creation of a stakeholder process composed of San Joaquin River watershed interests to become engaged in the development of a Dissolved Oxygen Total Maximum Daily Load (DO-TMDL) and implementation plan. The Central Valley Regional Water Quality Control Board (RWQCB) approved forming a Steering Committee (SC) to support developing the DO-TMDL, including allocation of responsibility and developing an implementation plan and funding mechanism. A Technical Advisory Committee (TAC) was formed by the SC to provide advice on the sources and causes of the oxygen impairment and to help develop a cost effective control plan.

A broad spectrum of stakeholders has participated in the process over the past four years. These include representatives from the agricultural, urban, environmental, and industrial communities. Meeting on a monthly basis the SC has discussed numerous proposals and issues related to the impairment of DO in the San Joaquin River Deep Water Ship Channel (DWSC) and development of a possible control measure. It is estimated that the stakeholders have expended over $750,000 in direct time or payment to consultants throughout the process. In addition the CALFED Bay-Delta Program has provided approximately $3.9 million in grant funding for scientific studies. The SC and TAC have always and will always remain open to any participant.

At this time the SC is proposing a comprehensive phased approach for near-term reduction of the low DO problem in the DWSC with a demonstration aeration

project, monitoring, and continued studies to support a long-lasting solution. Overall the SC plan provides for interim DO performance goals, an aeration demonstration project, monitoring of DO demand constituents, continuation of scientific studies throughout the watershed to answer questions of concern, analysis of other control measures, support for the long-term implementation planning, and overall coordination of the effort. Due to the complexities involved in addressing all the factors associated with the sources and causes of low DO in the DWSC, the SC does not believe assignment of responsibility through a traditional load allocation is necessary. However, the plan put forth will move the process along a path toward solving the impairment while providing some near-term relief. The stakeholders of the watershed are committed to stay engaged in the process.

In addition the SC is energized with the prospect of moving forward with a plan that will lead to a fair and equitable long-term solution to the DO impairment. This plan is the culmination of four years of discussions, special studies, independent science peer reviews, and commitment by stakeholders. Implementation of any long-term plan of this magnitude will be costly. Funding through the Safe Drinking Water, Clean Water, Watershed Protection, and Flood Protection Bond Act of 2000 exists to initiate the plan (Proposition 13, 2000). In addition the stakeholders are developing their own mechanism to fund the continued operation of the plan if other funding sources no longer exist.

Background

The Basin Plan for the Sacramento-San Joaquin Bay-Delta Estuary contains a water quality objective requiring that oxygen levels be maintained above 6 mg/l between September 1 and November 30 and above 5 mg/l at all other times. The 6 mg/l objective was adopted to protect the upstream migration of fall run Chinook salmon by the State Water Resources Control Board in 1991.

The upper reach of the DWSC, near its confluence with the San Joaquin River experiences periods of low dissolved oxygen. Though most prolonged and acute during the summer months, long-term monitoring indicates that low DO episodes can occur during any month of the year. The most severe episodes of low DO usually occur during the months of June through October. However, the past several years' records indicate there have been low DO occurrences in nearly any month. Faced with this situation the State of California placed the upper reach of the DWSC on the Clean Water Act 303(d) list in 1994 and committed to deliver a technical Total Maximum Daily Load (TMDL) to the U.S. Environmental Protection Agency by June 2003.

In recognizing the low DO problem in the lower San Joaquin River the CALFED Bay-Delta Program identified this as a priority item in its August 28, 2000 Programmatic Environmental Statement/Report Record of Decision. The Bay-Delta Program lists the low DO situation as a specific implementation action item. Included within the October 2001 CALFED Draft Sacramento-San Joaquin River Delta Regional Implementation Plan improving dissolved oxygen conditions in the San Joaquin River

near Stockton is identified as an ecosystem restoration program commitment. It is believed that the low DO creates a migratory block for adult Chinook salmon returning to San Joaquin River tributaries to spawn.

Causes and Factors

Through support of the CALFED Bay-Delta Program the SC sponsored a number of scientific studies on the causes and factors influencing the low DO in the DWSC. These studies were concluded with independent science peer reviews conducted by CALFED in 2000 and again in 2002 (Exhibit A). Thirteen individual studies were synthesized and included as part of the 2002 Scientific Peer Review. The Synthesis of Findings Report along with the individual reports and response to the peer panel recommendations have been made available to your staff. From these past studies many factors are known to influence low DO in the DWSC. These include growth of algae within the DWSC, City of Stockton wastewater discharge, sediment oxygen demand, low light penetration, algal nutrients, temperature, low San Joaquin River flows through the DWSC (transport velocities), and construction and maintenance of the DWSC.

The DWSC and lower San Joaquin River are tidally influenced with a range of about 3-foot tides and a tidal flow of 2,000 to 4,000 cubic feet per second. Flow of the San Joaquin River at Vernalis ranges from the mid hundreds to several thousand cubic feet per second during June through November. However the tide and flow through side channels between Vernalis and the DWSC greatly influences the actual flow through the DWSC. Typically the net downstream flow through the DWSC ranges from 100 to over 2,000 cubic feet per second, but can in some instances be negative (upstream). During periods of low flow when combined with upstream loads, high water temperatures, and low light penetration reaching the lower depths of the DWSC, DO concentrations are drastically diminished. At the upper end of the flow range the velocity is usually sufficient to carry DO depleting material through the DWSC and low DO is not a problem.

Loading of DO depleting materials and precursors consist of organic solids, nutrients (nitrogen and phosphorus), ammonia, and algae. The general chemical reactions involved with these materials is known, however, the transformation and fate of these materials as they are transported downstream from various sources in the watershed to the DWSC is not well understood. It is known that algae reproduce as they are transported downstream and that this process is generally influenced by the nutrients and temperature in the river. These conditions along with abundant sunlight support the reproduction of algae in the river.

As this algal load enters the DWSC, it becomes mixed throughout the water column through flow and tidal exchanges. At times during the summer months when San Joaquin River flow is at its lowest, and a significant portion of the flow enters the Old River the flow of the DWSC may be negative, meaning the tidal influence causes a reverse or "up-river" flow pattern. The low flow, when combined with the turbidity in the DWSC, limits the light penetration needed to support photosynthesis

to enable the algae to continue to grow. Without light the algae die off and the process changes from one of aerobic to one of increasing biological oxygen demand.

Once the biological oxygen demand increases, the oxygen loss can accelerate to a level that causes violation of the DO water quality objective and potential harm to aquatic life within the DWSC. While not directly observed in the DWSC, low DO in a water body is known to cause slowing of aquatic growth rates, larval fish kills and loss of organisms that provide fish food. It is a concern that the low DO in the DWSC may have an impact on the homing migration of anadromous fish, particularly the fall-run Chinook Salmon returning to the San Joaquin River tributaries.

Initial construction of the DWSC began in about 1875 in response to agricultural and industrial growth in California and particularly the Central Valley. This was at the beginning of an era of rapid growth and development of the American West encouraged and supported by both state and federal governments. Over time the DWSC was expanded in width and depth to accommodate the demands for larger ships to carry products in and out of the Central Valley. The most recent change to the channel took place between 1984 and 1987 when the U.S. Army Corps of Engineers (USACE) deepened the channel to a depth of 35 feet. Upstream of Channel Point, at the confluence of the San Joaquin River with the DWSC, the river is approximately 8 – 10 feet deep and 150 feet wide. Immediately downstream of Channel Point the DWSC expands to approximately 35 - 40 feet deep and 250 feet wide causing the velocity of any river flow to significantly diminish. The velocity continues to decrease a short distance downstream as the channel quickly widens to a width of nearly 500 feet. At the downstream end of the "impaired" water body, near Turner Cut, the DWSC widens to as much as 1000 feet increasing the cross-sectional area and further diminishing the flow velocity. The combination of diminished flow velocity and tidal action increases the residence time of oxygen demanding materials in the DWSC, which leads to greater DO depletion.

Addressing DO Depletion

Control of low dissolved oxygen concentrations in the DWSC does not lend itself to a typical TMDL load allocation. DO is the symptom of other related problems. A solution for low DO in the DWSC is further complicated by the fact that the impaired water body is a man-made facility, not a natural system. One study sponsored by the SC concluded that the DWSC itself is a major contributing factor to low DO. Further, the study demonstrated that if the San Joaquin River was not artificially deepened and widened to form the DWSC, the DO problem would not exist (Chen and Tsai, 2002). Similarly if flows through the DWSC were increased throughout the year, the low DO problem would not exist. However, increasing flow is a double edged sword. Increasing the San Joaquin River flow into the DWSC decreases the residence time of algae and other oxygen demanding materials in the DWSC but also increases the load of oxygen demanding material entering the channel from the upstream watershed. The San Joaquin River watershed has a number of other water quality concerns that are under TMDL requirements in addition to the low DO

problem in the DWSC. The effects of implementing other non-DO TMDLs now under consideration by the RWQCB are unknown at this time.

Following extensive studies in 1971 the U.S. Environmental Protection Agency recommended that the DWSC not be deepened without some mitigation for low DO. As a result the USACE determined the quantity of mechanical aeration that would be needed to mitigate for DO impacts of deepening of the channel, but not the problem caused by the initial construction of the DWSC. Following the 1987 deepening of the channel the USACE installed, and continues to operate, an aeration device designed to deliver up to 2,500 lbs/day of oxygen. By agreement the USACE operates the aeration device between September and November if oxygen levels fall below 5.2 mg/l. To date no detailed study has been undertaken to determine if the installed device is meeting the agreed upon mitigation responsibility. A limited study sponsored by the SC in the summer of 2001 concluded that the existing device was delivering only about one-third the required mitigation at that time (Brown, 2003).

Defining responsibility under a traditional TMDL approach does not apply to the DWSC. There is no existing standard or basis for allocating the responsibility for the impairment of DO in the DWSC. While upstream dischargers contribute to the oxygen demand load entering the DWSC, responsibility is not solely a matter of upstream responsibility in the form of load reduction. It is the opinion of the SC that since the DWSC benefits many users throughout the watershed of the Central Valley; consideration must also be given to direct and indirect beneficiaries taking some responsibility. Additionally, the DWSC was created through the support of state and federal governments and therefore, some responsibility must be shared there as well.

Load Allocation

The key objective for forming the SC was to receive recommendations from a TCA on studies to be performed, the allocation of loads (and responsibility), development of a strategy and schedule for implementing the TMDL, and financing needed to support a long-term implementation plan. The SC does not believe equitable responsibility can be identified through a traditional load allocation mechanism that takes into account all the factors that contribute to the depletion of DO in the DWSC. At the July 2002 RWQCB meeting your staff suggested implementing a traditional load allocation by means of implementing other TMDLs currently under consideration, adopting conditions on future water quality certifications, imposing new NPDES wastewater discharge permit conditions, and possibly imposing applicable conditions on future water right actions. Such an implementation would focus primarily on the users of water in the basin and would not take into account other parties in and out of the San Joaquin River watershed that benefit from the use of the DWSC, the parties responsible for the creation of the DWSC, or those that export water from the basin. At this time the incorporation of the responsibility of these parties in a load allocation is yet to be developed.

Therefore, the SC has concluded that a load allocation at this time is premature. The SC is proposing an overall implementation plan to look in greater detail at the sources and causes of DO depleting material from the watershed, to further analyze the dynamics of biochemical oxygen demand (BOD) in the DWSC, determine the feasibility of aeration within the DWSC, provide a mechanism for funding, a program to determine the feasibility of load reduction and flow improvement options such as CALFED's South Delta Barriers Program, and meet interim DO objectives through aeration. This plan supports the long-term implementation planning and scheduled basin plan amendment process.

Phased Implementation

With the complexities of defining responsibility among the parties and the linkage between the San Joaquin River and the DWSC a phased approach to implementing the TDML is being recommended. A phased implementation approach is discussed in greater detail in the paper entitle, "San Joaquin River Low Dissolved Oxygen Total Maximum Daily Load: Interim Performance Goal and Final Target Analysis Report" (Gowdy and Foe, 2002). The phased approach will allow time to address the responsibility issues, refine source control measures, evaluate initial implementation alternatives, provide identification of additional alternatives to meet the final Basin Plan DO objectives, and examine the technical basis for the Basin Plan DO objectives.

Phase 1 will concentrate on completing the additional studies needed to develop the linkage between the San Joaquin River and the DWSC. This is in response to unresolved issues identified in the earlier studies and also to recommendations made by the CALFED scientific peer review conducted in 2002 (Exhibit A, Lee and Jones-Lee, 2002). The first phase will provide the opportunity to identify and evaluate a broad range of management practices and control options within the watershed and DWSC that may assist in meeting the DO objectives.

Analysis over the past several years and intense studies since 1999 have answered many questions about the BOD of the system and the low DO problem in the DWSC. The results of these same efforts have also produced more questions as evidenced by the 2002 peer review. A phased approach will allow bridging the gap between what is known and what remains to be evaluated before a long-term implementation plan can be developed. Phase 1 will also allow for other non-DO TMDL implementation plans to mature and the cumulative effects to be evaluated.

Phase 2 will incorporate the findings from the first phase and all new information into a feasibility analysis. This analysis is intended to result in a preferred control alternative to comply with the long-term DO Basin Plan process.

Throughout the phased approach the SC proposes that an interim DO performance goal be met through aeration of the DWSC until the long-term Basin Plan is approved and implemented. The interim performance DO goal is less stringent than the current Basin Plan DO objective, but, will be a significant improvement over

current conditions and is intended to provide a base level of protection for beneficial uses.

Recommendation: The SC recommends the implementation of the Phase 1 TMDL Implementation plan as described below.

Phase 1 TMDL Implementation

A. Interim DO Performance Goal

The SC recognizes that time is necessary to complete the planning and implementation for a long-term Basin Plan Amendment. Regardless of other water quality actions that may be implemented within the watershed over the long term, it is the SC opinion that some degree of mechanical aeration will be required if violation of the DWSC DO objectives are to be eliminated. Operation of a demonstration aeration project within the DWSC to meet interim DO goal is a viable measure until a long-term Basin Plan is adopted.

The SC recommends the interim DO performance goal for the DWSC be met through operation of a demonstration aeration project as follows:

1. Between June 1 and November 30, dissolved oxygen shall not be less than 5.0 mg/l within the DWSC between Channel Point and Disappointment Slough, measured on a 7-day mean of daily minimums.
    a. No daily minimum dissolved oxygen level shall be less than 3.0 mg/l.
2. Between December 1 and May 31, the daily dissolved oxygen level shall not be less than 5.0 mg/l within the DWSC between Channel Point and Disappointment Slough.

The 5.0 mg/l interim DO performance goal is essentially the criterion suggested by the U.S. Environmental Protection Agency (EPA, 1986). This will provide a milestone towards meeting the Basin Plan DO objective and will provide a level of protection for beneficial uses and represent an improvement over DO concentrations currently within the DWSC.

B. Performance Goal Assurance Package

Proposition 13 provides funding to address low dissolved oxygen conditions in the South Delta and lower San Joaquin River. Article 3.1.1 reads, "79190(d) (1) "Eligible project" means a demonstration project, subject to the CALFED adaptive management principles that requires an assessment of the performance of the demonstration projects in order to determine which projects are successful in achieving the goals of the program." In identifying eligible projects Article 3.1.2 reads, "79190(d)(2)(B)(ii) Constructs facilities to control waste discharges that contribute to low dissolved oxygen and other water quality problems in the lower San Joaquin River and south delta."

Until the aeration feasibility study is completed it is difficult to project the cost of aeration or the environmental compliance that may be required. Without a better appreciation for the design, operation, and environmental requirements the

stakeholders are unable to institute the appropriate funding mechanism and management structure to support the project.

The stakeholders are committed to continue support of the DO-TMDL effort and to build on the progress already made. Over the past several months the stakeholders have developed a draft assurance agreement to share the financial burden of operating and maintaining the aeration project if other funds are not available. The SC recently developed a draft letter to be sent by stakeholders to the RWQCB expressing their intent to continue support of the DO-TMDL process and to ultimately provide the necessary support to operate and maintain an aeration facility depending on the outcome of the feasibility and environmental studies. The SC will be urging the various stakeholders to submit those letters of intent as quickly as possible.

C. Aeration Demonstration Project

As part of the "Strawman" source and linkage analysis conducted by RWQCB staff the transformation of DO and BOD entering the DWSC was evaluated (Foe, Gowdy, McCarthy, 2002, and Lee and Jones-Lee, 2002). Through this process the investigators were able to demonstrate how the DO inflection point (point of lowest DO) in the DWSC would change as San Joaquin River flows entering the DWSC also change. This was first noted in the Lee and Jones-Lee 2000 Issues Report. This analysis along with companion studies was useful in evaluating the reaeration potential within the DWSC. Studies to date estimate that, at a flow rate of 1,000 cubic feet per second through the DWSC with BOD_5 levels between 10 and 13 mg/L, that 3,300 and 8,500 lbs/day of additional dissolved oxygen are needed to avoid violations of the water quality objectives in the DWSC (Foe, Gowdy, McCarthy, 2002) (Brown 2003).

It is not known at this time what combination of flow, upstream load management, and aeration will ultimately be employed in the long-term implementation plan. However, it is known that aeration of the DWSC can provide near-term relief to the low DO while a final suite of alternatives are evaluated. The SC generally believes that because the DWSC is a man-made facility, that altered the natural flow of the river, a portion of any alternative solution will likely require inclusion of a man-made element such as aeration.

The CALFED peer review summary report states that, "There is a need to develop information on various aeration schemes/technologies, including performance of science-based demonstrations at pilot scale." In meeting this recommendation the steering committee with support from CALFED and your staff proposed that an aeration feasibility study be initiated. Performance monitoring and adaptive management will be an integral part of the demonstration project. Working closely with CALFED consultants the SC has supported CALFED in developing a scope of work to carry out the feasibility study of aeration. The scope of work includes:

1. Alternatives analysis and feasibility study to select the best aeration technology.

2. Monitoring to support project design, modeling efforts, effectiveness evaluations, as well as to further define factors affecting the problem.
3. Modeling to support project design and adaptive management during implementation.
4. Project design, including development of alternatives, feasibility study, and construction plans and specifications for the selected alternative.
5. Environmental planning and permitting to comply with applicable regulations.

Currently, CALFED is engaging a qualified consultant to conduct this feasibility study under the Aeration Scope of Work (Exhibit B). As the alternatives analysis and feasibility study is conducted some small scale pilot aeration projects will likely be installed for testing purposes. These pilot projects may provide some minimal relief to the low DO concern as early as summer 2003. Completion of the feasibility study is scheduled for January 2004. It is anticipated that the feasibility analysis will provide direction for the construction of a full-scale demonstration project to meet interim DO objectives of the DWSC while the long-term TMDL implementation planning process is underway. Following the environmental analysis, permitting, design, and construction, the demonstration project could be operational by June 2005.

D. Upstream Monitoring and Study Proposal

Upstream studies will be supported through a stakeholder sponsored CALFED grant to conduct the necessary activities consistent with the peer review recommendations. The CALFED peer review summary report states, "There was general agreement among the reviewers that the data have established that there is a strong correlation between flow rates and dissolved oxygen levels. However, the roles of loadings of various types and sources of oxygen-demanding materials are not well understood." The proposal represents a series of scientific studies supported by monitoring of field data and hydrodynamic and water quality modeling. Study results will be used to support the RWQCB determination of a feasible alternative in developing the necessary amendment to the Basin Plan. Objectives for the upstream studies will be:

1. Establish a comprehensive monitoring program to characterize the loading of algae, other oxygen demanding materials and nutrients from individual tributaries and sub-watersheds of the upper San Joaquin River.
2. Characterize the fate of nutrients and transformation and fate of algae and other oxygen demanding materials between their sources in the watershed and the DWSC.
3. Characterize the temporal variability of parameter concentrations on a daily and seasonal basis.
4. Provide input and calibration data for water quality modeling in the San Joaquin River watershed associated with low DO in the DWSC.
5. Provide stakeholder confidence in the comprehensive monitoring program, so that the program can serve as an accepted reference for the development of a fair and equitable stakeholder TMDL allocation.

The peer review panel recommendations to be addressed by the studies include:

1. Improve and expand DO-TMDL related monitoring in the upper San Joaquin River.
2. Investigate the growth and mass balance of algae in the upper San Joaquin River.
3. Expand and directly integrate the river modeling with the data collection and scientific effort.
4. Further investigate the characterization of biological oxygen demand in the river.
5. Further investigate the section of the San Joaquin River between Vernalis and the DWSC.

In addition to the peer review panel recommendations the SC members made the following recommendations to further improve the upstream DO-TMDL program:

1. Verify the assumptions concerning algal dynamics used in the RWQCB Strawman load allocation.
2. Improve on past efforts with development of a comprehensive monitoring program.
3. Include internal watershed sites as well as river sites in an overall monitoring program.
4. Integrate the DO-TMDL with other TMDL efforts as much as possible.
5. Improve the confidence in the fairness of the DO-TMDL load allocation process.

The proposal will include additional monitoring for DO constituents at 39 existing monitoring locations and at 14 new sites to be installed throughout the watershed. The number and location of monitoring sites may change over the term of the study as the study managers gain information. Monitoring data will be assembled, undergo a thorough quality assurance/quality control review, receive an initial level of analysis and entered into a single managed database to be made available to the investigators, agencies, and the public. The database will be enhanced with other historic and related data as appropriate.

Independent, yet interrelated, scientific studies will be conducted throughout the coming three years to address the questions of the peer review panel and the concerns of the stakeholders. Frequent internal peer reviews will take place through the SC and TAC. Each year the investigators will present reports of progress and intermediate findings in a public setting. The RWQCB will be kept informed of the progress and findings of the studies. CALFED science program will assist in the intermediate and final science peer reviews, and a final summary report will be prepared for CALFED and the RWQCB.

State and federal agencies, including your own staff assisted in designing the monitoring program and studies in order to be of the greatest value in developing a long-term implementation plan. The SC is now working with CALFED and your staff in developing a solicitation package for a number of special studies to target

questions of concern. This will augment the work already completed or underway and will support the development and selection of alternatives to be analyzed in the long-term planning process.

The stakeholder sponsors will soon be submitting the proposal to CALFED for consideration. A copy will be provided to the RWQCB at that time. The proposal will be subject to a peer review by a panel of CALFED scientist before being approved. It is anticipated that the proposal will be approved and the grant awarded no later than May 2003.

Phase 2 Long-Term TMDL Implementation

A. Alternatives Analysis

In addition to the Upstream Monitoring and Study proposal included in the Phase 1 Implementation, the SC is making progress toward additional focused studies and demonstration projects to support the Phase 2 Long-Term Implementation. As discussed here and in the supporting materials numerous factors affect the DO conditions of the lower San Joaquin River and particularly the DWSC. How these factors may be addressed will be the subject of further study and field demonstration projects. Ultimately the Phase 1 and Phase 2 studies will support the type of feasibility alternatives analysis and environmental analysis necessary to develop a long-term implementation plan.

The SC is now developing a process to invite proponents from throughout the region and elsewhere to submit potential options or alternatives for consideration. This was the first step on a much more detailed scoping and screening of alternatives to be the subject of in-depth analysis. Through a public scoping workshop, to be held in the coming months, these options or alternatives will be reviewed and additional suggestions developed. Some proposals will likely include field demonstrations of management practices that may provide benefit to a wide spectrum of water quality issues.

Finally, the SC will prepare and submit to CALFED a list of suggested subject areas for consideration in future grant solicitations. Following a review by the CALFED science program it is anticipated by the SC that grant solicitations for a wide range of non-aeration alternatives will be issued by July 2003. Following the review and award of grants the analysis of these alternatives will be completed possibly as early as spring 2005.

The SC will provide you with the list of potential options and alternatives as they become available and will keep you informed of our progress.

B. Other Water Management Programs that Affect DO Depletion

A number of independent studies and actions within the San Joaquin River basin and south Delta are being carried out that could significantly affect how the DO problem of the DWSC is addressed. A few of those are listed below as examples. The SC

members are participating in many of these relevant studies and actions as stakeholders.

1. CALFED's South Delta Improvement Program is expected to produce an EIR and preferred alternative in May 2003. This proposal will include four permanent South Delta barriers to be built as soon as possible and operated as needed to maintain water levels and water quality in Old River, Middle River, and Grantline Canal in the South Delta. How the South Delta barriers operate will have an influence on the DO level in the DWSC. If the barriers were to be operated in a closed position this could reduce the flow from the San Joaquin River entering Old River and thereby increasing the frequency of higher flow through the DWSC possibly avoiding some violations of the DO standard. The South Delta Improvement Program could also make it possible to pump water upstream through the head of Old River into the San Joaquin and thereby augmenting inflow to the DWSC.

2. The USBR has developed a tentative preferred alternative to comply with a court-ordered requirement to provide drainage for the agricultural entities in the Central Valley Project's westside service area that now drain into the river. If implemented this will somewhat reduce the quantity and alter the quality of drainage into the river. The effect of this change on the DO problem must be analyzed.

3. CALFED is currently conducting the Upper San Joaquin River Basin Storage Investigations. This study will consider a range of approaches to increase water supplies through the enlargement of Millerton Lake or a functionally equivalent storage program. How increasing the water supply through added water storage in the upper basin will affect water quality and flow of the San Joaquin River in general and the related DO problem of the DWSC is unknown at this time and will need to be evaluated as part of the investigations.

4. The Port of Stockton is in the process of redeveloping the former U.S. navy base on Rough and Ready Island. This expanded portion of the Port (now referred to as the Port's West Complex) will operate in similar fashion to their existing functions. The Port is currently preparing a number of redevelopment plans and environmental compliance documents associated with the proposed expansion. One near-term project component of the expansion is the cleaning and deepening of the area in front of all docks at the West Complex to a depth equivalent to the Stockton Deep Water Ship Channel. Preliminary discussions between the Port and USACE have also taken place over the feasibility of deepening the entire DWSC. As with any proposed project that modifies the system the impacts to the DO levels in the DWSC will need to be evaluated.

5. Water Right Decision 1641 for Implementation of the Water Quality Objectives for the San Francisco Bay/ Sacramento-San Joaquin Delta Estuary modified the flows objectives of the San Joaquin River at Vernalis. How meeting these flow objectives and other water quality objectives of the Delta affect the DO problem of the DWSC

is only beginning to be evaluated in any detail. Further study will be necessary to define the relationship.

6. The cumulative affect on the DO problem of the DWSC caused by implementing other current non-DO TMDLs has not been fully evaluated. It will be necessary in the long-term implementation planning to address the cumulative impacts.

Schedule

The multifaceted approach to the DO-TMDL process could not be accomplished without close tracking of individual steps and schedules that must be coordinated. It is important to understand that there is not definite ending date for Phase 1 and start to Phase 2. As information becomes available throughout the Phase 1 implementation it will be put to use in the Phase 2 planning process. Current schedules identify the upstream studies to be accomplished at various times over the next three years. At this time the upstream stakeholders are awaiting the science peer review and grant award from CALFED. Shortly CALFED is expected to award a contract for the aeration feasibility study for the DWSC and the SC is working with CALFED on a solicitation package for additional non-aeration studies. Together this work will support the long-term implementation planning and amendment to the basin plan. Coinciding with the ongoing planning process the interim DO performance goal is expected to be met with aeration beginning in 2005 and continuing through the end of Phase 2. The entire effort will culminate with the Basin Plan Amendment anticipated by 2008.

PHASE I IMPLEMENTATION PLAN

RWQCB TMDL Milestones	Tentative Completion
TMDL Report to USEPA	Jun. 2003
Basin Plan Amendment Workshop	Aug. 2003
Phase I Basin Plan Amendment	Jun. 2004
RWQCB Hearing and Approval	Jun. 2004
Aeration Demonstration Project	
Aeration Alternatives Analysis	May 2003
Feasibility Study	Jan. 2004
CALFED Peer review and approval	Jun. 2004
Stakeholder Assurance Package	Sep. 2004
Environmental documentation and permitting	Dec. 2004
Monitoring and Adaptive Management Plan	Mar. 2005
Project design and construction	Jun. 2005
Begin Aeration Demonstration Implementation	Jun. 2005
Upstream Monitoring and Studies	
Monitoring and study proposal development	Jan. 2003
CALFED Peer review and award	May 2003
Data collection and evaluation	May 2006

PHASE II LONG-TERM IMPLEMENTATION PLANNING

Non-Aeration Alternatives Analysis	
Alternatives Workshop	May 2003
CALFED Solicitation for Focused Studies	Sep. 2003
Study Report and Peer Review	Jan. 2005
Alternatives Analysis	Sep. 2005
Phase II DO Performance Criteria	
Plan of Study	Nov. 2003
Report and Recommendations	Feb. 2005
Performance Criteria for Feasibility Study	Apr. 2005
Long-Term Feasibility Study	
Conduct Additional Studies	Dec. 2005
Final Feasibility Report	Aug. 2006
Technical TMDL Report	Apr. 2007
CEQA for Phase II	Jan. 2008
Implement Basin Plan Amendment	Jan. 2008

A preliminary detailed schedule is attached to provide additional information of the steps and process for each activity (Exhibit C). Both the schedule shown above and the one attached will be reviewed and updated as the program progresses.

Program Coordination

The phased implementation process consists of multiple various activities and studies that together make up the implementation plan. While most of the activities are being carried out through stakeholder involvement, independent studies, and CALFED support it is imperative that these effort are coordinated. Early in the DO-TMDL process the SC identified the need for a dedicated program coordinator or coordination team to assist the parties in overseeing and managing the program. It is clearly understood by the parties that the program coordinator will not supervise the work but is critical to the SC in providing the necessary support, overview, and coordination needed to successfully produce a long-term solution. The SC, working with CALFED and your staff, recommended that CALFED proceed with the engagement of a project coordinator through its qualified contractor pool. An early task of the program coordinator will be to prepare a planning process strategy and

updated program schedule with milestones to guide the overall effort. In this regard the SC developed a scope of work and a program coordinator or team is now being sought (Exhibit D).

Sincerely,

/s/ *Lowell F. Ploss*

Lowell F. Ploss, Chair
DO-TMDL Steering Committee

Enclosures

Exhibit A – San Joaquin River Dissolved Oxygen TMDL Studies, Draft Peer Review Report, July 1, 2002

Exhibit B – San Joaquin River Deep Water Ship Channel Demonstration Aeration Project Scope of Work, October 30, 2002

Exhibit C- Project Schedule DO-TMDL, December 18, 2002

Exhibit D – Project Coordinator Scope of Work Dissolved Oxygen TMDL San River Deep Water Ship Channel

<u>References</u>

Proposition 13. "The Safe Drinking Water, Clean Water, Watershed Protection, and Flood Protection Bond Act., March (2000).

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